I. REPLY TO REJECTION OF CLAIMS MADE UNDER 35 USC §102

Claims 35, 36, 42, 43 and 44 have been rejected under 35 USC §102 as being anticipated by US Patent No. 3,733,178 to Eriksen (hereinafter referred to as "Eriksen"). The Office Action alleges that:

> Eriksen teaches a chemical coding method wherein coding is accomplished by allotting each container a code or identifying number comprising one or more digits (from zero to nine). The chemical identifiers disclose a number uniquely associated with the container and its contents.

Claims 35, 36, 42, 43 and 44 have also been rejected under 35 USC §102 as being anticipated by US Patent No. 5,279,967 to Bode (hereinafter referred to as "Bode"). The Office Action alleges that:

> Bode teaches a liquid identification and tracing system based on the 2^{n-1} binomial system. See col.3, line 25-conl. 4, line 20.

It is well settled that to anticipate a claim under 35 USC §102 every element and limitation of the claimed invention must be found, literally or inherently, in a single prior art reference. *Karsten Mfg. Corp. v. Cleveland Golf Co.,* 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001). Applicant will show that these rejections are in error because not all claim elements and limitations are found in either Eriksen or Bode.

A. Limitations of Claims 35, 36, 42, 43, and 44 Relevant to the Present Rejection

Claim 35 and its dependent claim 36 require one or more pairs of chemicals in which the **presence** of one chemical of each pair represents a first bit value, and the **presence** of the other

chemical represents a second bit value. Claim 42 requires a pair of taggant chemicals in which the **presence** of one chemical represents a first bit value, and the **presence** of the other chemical represents a second bit value. Dependent Claim 43 additionally requires a second pair of chemicals in which the **presence** of one chemical of the second pair represents a first bit value of a second bit, and the **presence** of the other chemical represents a second bit value of a second bit. Claim 44 also depends from claim 42, and additionally requires multiple additional pairs of chemicals in which the **presence** of one chemical of each pair represents one of two possible bit values. The simplest case possible for the claimed method would be a binary process, using, for example, only a single pair of chemicals and only the bit values of "0" and "1." In such a case the presence of one of the chemicals, chemical "1A" would represent one of the bit values, "0," and the presence of the other chemical, chemical "1B," would represent the other bit value, "1." A more complex system would have *n* pairs of chemicals, with each pair associated with one bit in an *n*-bit binary serial number. With *n*=3, there would be three pairs of chemicals; 1A and 1B, associated with the first bit; 2A and 2B, associated with the second bit; and 3A and 3B, associated with the third bit. Thus, the presence of 1A would represent a bit value of "0" in the first bit. The presence of 1B would represent a bit value of "1" in the first bit. Similarly, the presence of 2A or 2B would represent bit values of "0" or "1" in the second bit, while the presence of either 3A or 3B would represent bit values of "0" or "1" in the third bit.

B. Reply to Rejection of Claims 35 and 36, 42, 43, and 44 as being anticipated by Eriksen

The Eriksen encoding method is very different from the methods presently claimed. The Eriksen code is digital rather than binary, and the value of each digit is represented not by the

presence of a chemical, but by the concentration of a chemical. This is in stark contrast to the claimed invention in which the bit values must be established by the presence of one or the other of the two chemicals.

Specifically, Eriksen teaches

> . . . identifying or coding containers and their contents comprising adding chemical identifiers, in predetermined amounts, to each container,... [col. 1, lines 52-55]
>
> During the analysis of the contents of each coded container, the concentration of each chemical identifier in the container is also determined,... [col. 1, lines 63-65]
>
> The amount of each identifier (except the reference identifier) added to the material is mathematically proportional to the digit, which it represents. [col. 2, lines 13-15]

Whereas the claimed process requires the presence of one of a pair of taggant chemicals in order for the process to work for its intended purpose, the Eriksen process requires a particular concentration of a taggant chemical in order for the process to work for its intended purpose. This difference in the taggant chemical requirement results in significant advantages to the claimed methods in comparison to the Eriksen method.

Thus, by associating the presence of each of a pair of chemicals with particular bit values in the claimed encoding process, additional functions and advantages are provided by the claimed invention as compared to the Eriksen process. For example, in the claimed method the presence of both chemical A and chemical B would indicated contamination, and the absence of both chemical A and chemical B would mean absence of the taggant, such as by destruction or some other reason.

As may be understood from the above discussion, the coding method disclosed by Eriksen is unreliable. The dependence on the concentration of a taggant chemical prevents ruling out of certain measurement errors or of the existence of other problems. This could result in the code of the Eriksen method being read incorrectly. Additionally, if two tagged substances are combined prior to the analysis (either accidentally, or perhaps intentionally, in order to defeat the taggant system), then the analysis in the Eriksen method would find a collection of taggant chemical that would include chemicals from both tagged substances, and the code could again be read incorrectly. Thus, the present invention, due to the required presence of one but not both of the chemicals, prevents these deficiencies of the Eriksen process from occurring.

1. Example 1 – Distinguishing Among 1000 Distinct Tagged Substances – Comparison of the Eriksen Method to the Claimed method

A comparison of how chemical taggants could provide coding in the two inventions highlights the difference in the inventions here. Consider as an example a method established to distinguish among 1000 distinct tagged substances. The coding method of Eriksen would require three chemicals, each of which is present at one of ten distinct concentrations (relative to a fourth reference chemical) to represent one of ten possible values of each of three digits in a serial number (for a total of 1000 possible serial number values). The value of the serial number of an unknown sample is determined by measuring the concentration of each of the three chemicals (relative to the reference chemical). However, in this method, it is possible to read the code incorrectly since accurate determination of precise chemical concentration can be problematic. For example, instrument calibration errors or operator errors can lead to incorrect concentration readings. Unexpected chemical reactions could also change the concentration of a chemical taggant. If two tagged substances are combined, the concentration of the taggant chemicals in

the resulting mixture will depend on the concentrations in the original substances and on the relative amounts of the two substances in the combined mixture. In each of these cases, the resulting taggant code read likely will have little or no relation to the original taggant code, and the tagged substance will be incorrectly identified, without any indication that an error has been made.

In contrast, applying the coding method of the present invention to distinguish among 1000 distinct tagged substances would required ten pairs of chemicals, where the presence of one of the two members of each pair represents one of two possible values (either "0" or "1") of each bit in a 10-bit binary serial number (for a total of 1024 possible serial number values). The 20 chemicals required for this system could be identified as chemical 1A, 1B, 2A, 2B, and so on up to 10A and 10B. The value of the first bit in the code is indicated by either the presence of chemical 1A (indicating a value of "0") or the presence of chemical 1B (indicating a value of "1"). In no case should both chemicals of the pair 1A and 1B be present, or both be absent. Additionally, because information is carried in the concentration of either chemical (beyond the simple fact of presence or absence), uncertainties in concentration measurement are irrelevant. Upon analysis, if chemical 1A is found, the bit would be assigned a value of zero. If chemical 1B is found, the bit would be assigned a value of one. Thus, the claimed method provides for automatic error detection. If neither chemical 1A nor 1B is found to be present, the observer knows that he has not succeeded in reading the taggant, and will not mistakenly assume that he has read a bit value of zero. If both chemicals 1A and 1B are found to be present, then the observer knows that there has been contamination, and again is prevented from reading an incorrect code.

The same logic applies to the chemical pair 2A and 2B associated with the second bit of the serial number in the presently claimed invention. Specifically, the presence of 2A indicates the second bit has a value of "0", while the presence of 2B indicates the second bit has a value of "1." Again, the presence of both 2A and 2B, or the absence of both 2A and 2B would be indicative of an error in the process. Applying the same logic to each of the ten pairs of chemicals provides for the creation of a 10-bit binary serial number, which can have any of 1024 possible values.

2. Example 2 – A Tagged Substance with Serial No. 617 – Comparison of the Eriksen Method to the Claimed Method

Continuing this example with a comparison of how the Eriksen method and the presently claimed method would be applied to a specific case further highlights the differences between these methods. Consider a tagged substance with the serial number 617. In the method of Eriksen (as described between col. 5, line 60 and col. 6, line 10), three chemicals, say A, B, and C, along with a reference chemical R, would be added to the substance with A, B, and C present at concentrations of 6/5, 1/5, and 7/5 (relative to the reference chemical concentration of "5"). On analysis, if an error is made in reading the concentration of any of the chemicals (A, B, C, or R), then the resulting serial number will be incorrect and there will be no readily apparent indicator of the error. If quantities of two tagged substances are combined (either accidentally, or perhaps intentionally, in order to defeat the taggant system), then any attempt to read the taggant code is likely to give erroneous results. For example, if equal quantities of substances with serial numbers 617 and 475 are combined, the resulting mixture will have concentrations of the three taggant chemicals, A, B, and C, of 5/5, 4/5, and 6/5, respectively, relative to the concentration "5", of the reference chemical R. Accurate measurement of the taggant chemical concentrations

would provide data indicating a serial number of 546, which matches neither of the original tagged substances but still produces a result that appears to be valid. [(6+4)/2 = 10/2 = 5; (1+7)/2 = 8/2 = 4; (7+5)/2 = 12/2 = 6]

Applying the coding method of the present invention to the above Example 2 illustrates how the present invention overcomes the deficiencies of the Eriksen invention. The binary equivalent of the digital number 617 is 1001101001. As such, substance 617 would be tagged with chemicals 1B, 2A, 3A, 4B, 5B, 6A, 7B, 8A, 9A, and 10B, while the chemicals 1A, 2B, 3B, 4A, 5A, 6B, 7A, 8B, 9B, and 10A would be absent. When reading the taggant code, it is unnecessary to make precise measurements of the concentrations of any of the taggant chemicals; it is only necessary to check for the presence of absences of each of the 20 possible taggant chemicals. Since presence or absence is a much easier determination to make than precise concentration measurements, the possibility for error is significantly reduced. In addition, if an error is made, for example missing the presence of chemical 10B, the resulting observation, that apparently both 10A and 10B are absent, would alert the operator that an error had occurred. Similarly, an erroneous positive detection of chemical 10A would signal an error when the operator observes that both 10A and 10B have apparently been detected.

Continuing with the above example, if substances 617 (1001101001) and 475 (0111011011) are combined, an attempt to read the taggant code will give the result ***1**10*1, where the * indicates that both chemicals indicative of that bit were found to be present. Thus, the presently claimed method will provide a readily apparent error in the serial number, but the method of Eriksen will not.

C. Reply to Rejection of Claims 35, 36, 42, 43, and 44 as being anticipated by Bode

The encoding method described by Bode is also fundamentally different from the claimed method. Bode represents bit values by the presence and **absence** of a particular taggant chemical. While the simplest encoding method of Bode could also be a binary method, with one bit value being a "0" and the other bit value being a "1," the bit values in Bode are established by the presence or absence of the particular taggant chemical. This is in stark contrast to the claimed invention in which the bit values must be established by the presence of one or the other of the two chemicals.

Specifically, Bode teaches that

> For example, when the variable is concentration and the system is base 2 (binary), then M has 2 possible values: 0 and 1. When the number is 0, the label is absent. When the number is 1, the label is present at a concentration high enough to be detected by the chosen fluorescent analytical method. [col. 3, lines 35-40]

Thus, whereas the claimed process requires the presence of one, and only one, of the pair of chemicals in order for the process to work for its intended purpose, the Bode process requires either the presence or absence of a single chemical.

By associating the presence of each of a pair of chemicals with particular bit values in the claimed encoding process, additional functions and advantages are provided as compared to the Bode process. In the claimed method the presence of both chemical A and chemical B would indicated contamination, and the absence of both chemical A and chemical B would mean absence of the taggant, such as by destruction or some other reason.

As may be understood from the above discussion, the coding method disclosed by Bode is unreliable. The absence of a taggant chemical prevents ruling out of certain errors or of the existence of other problems. Specifically, the apparent absence of a taggant chemical in a sample may be due to a failure to collect or observe any of the relevant chemical rather than due to its actual absence in the tagged substance being sampled. This could result in the code of a particular sample, being incorrectly read when using the Bode method. Additionally, if two tagged substances are combined prior to the analysis (either accidentally, or perhaps intentionally, in order to defeat the taggant system), then the analysis in the Bode method would find a collection of taggant chemicals that would include chemicals from both tagged substances, and the code of the sample could again be read incorrectly. With the presently claimed process, however, due to the required presence of one but not both of the chemicals, these deficiencies of the Bode process would not occur.

1. Example 3 – Tagged Substance with Serial Nos. 617 and 475 – Comparison of the Bode Method to the Claimed method

A comparison of how presently claimed method and the Bode method would provide coding two inventions highlights the differences in the inventions here. For a substance with serial No. 617 in the Bode method, the first bit would be assigned a single chemical, for example, chemical A. If, on analysis, this chemical is not found, the bit is assumed to have a value of zero. If the chemical is found, the bit is assumed to have a value of one. However, in the Bode method, it is possible to read the code incorrectly if, for example, the sample is too dilute to detect the taggant chemical, or if the taggant chemical has been destroyed through some unexpected chemical reaction, or simply through operator or instrument error. In any of these cases, the expectation that the absence of the taggant chemical would produce a valid result

allows the operator to be satisfied with an incorrect serial number. Similarly, if two tagged products are combined, one of which has chemical A, while the other does not, the presence of the sample that did not originally have chemical A is not detected. This situation is exemplified by how the Bode method would code a sample that contained a mixture of two samples, with initial binary serial numbers of 1001101001 (corresponding to a digital value of 617) and 0111011011 (corresponding to a digital value of 475), respectively. Using the Bode method this mixture would have a binary serial number of 1111111011 (corresponding to a digital value of 1019), which does not match either of the initial samples.

Applying the coding method of the present invention to the above example further serves to highlight the differences between the claimed invention and the Bode invention. For example, chemical A1 would indicate the value of "0" for the first bit, and chemical A2 would indicate the value of "1" for the first bit. When the sample is analyzed, one would expect to find either chemical A1 or chemical A2, but not both. If neither chemical is found, the observer knows that he has not analyzed a sufficient quantity of the sample (or that the sample has not been coded). If both chemicals are found, the observer knows that the code has been corrupted. In either case, he is prevented from assuming he has correctly read an incorrect code or interpreted the absence of a code to be a code of a certain value. In the case of the two combined samples with serial numbers 1001101001(digital value 617) and 0111011011 (digital value 475), the apparent serial number of the combined sample would be ***1**10*1, where the * indicates that the sample shows chemicals for both values of the bit. Thus in the presently claimed method the observer would know that the code had been corrupted and would be prevented from reporting an incorrect value for the code.

D. Claims 35, 36, 42, 43, and 44 Are Not Anticipated by Eriksen or Bode

Claim 35 recites "using multiple pairs of chemicals to represent the bits of a binary serial number wherein the presence of one chemical of each pair represents a first predetermined bit value and the presence of the other chemical of each pair represents a second predetermined bit value. This claim requires one or more pairs of chemicals in which the **presence** of one chemical of each pair represents a first bit value, and the **presence** of the other chemical represents a second bit value. In contrast to the method of Eriksen, in the presently claimed method no information is encoded in the concentration, and it is unnecessary to measure accurate concentration levels to read the code. In contrast to the Bode method, in the presently claimed invention no specific information is contained in the absence of a chemical, and failure to detect a chemical cannot be interpreted as indicative of a code value. The dependent claim 36 is directed toward assigning specific bit values of "0" and "1" to the chemical taggants of claim 35.

Claims 42, 43, and 44 are directed to a binary taggant having a first chemical of a first chemical pair, a second chemical of the first chemical pair; a first chemical of a second chemical pair, a second chemical of the second chemical pair; and a first chemical of an additional chemical pair and a second chemical of the additional chemical pair, respectively. These claims are, like claims 35 and 36, directed to a binary coding system in which each of two chemicals in a pair provides for a positive bit value determination.

In these claims the bit values for the first place or 2^0 place (claim 42); for the second place or 2^1 place (claim 43); and for the third and any additional place or 2^2 place and higher orders of places (claim 44) are represented by chemicals. As with the inventions of claims 35-36 each bit value is associated with the presence a chemical, rather than with the concentration of a chemical or with the absence of a chemical, in contrast to the inventions of Eriksen and Bode.

For all of the above reasons it is believed that the rejections were in error and should be withdrawn.

II. ACKNOWLEDGEMENT OF ALLOWANCE OF CLAIMS 37, 48, AND 49

Allowance of claims 37, 48, and 49 is acknowledged.

III. AUTHORIZATION TO CHARGE FEES

If any fees are due in regard to the present reply, authorization is hereby granted to charge Deposit Account 50-3725.

IV. CONCLUSION

For all of the above reasons it is requested that the rejections be withdrawn and that a Notice of Allowance of all pending claims be forthcoming.

Respectfully submitted,

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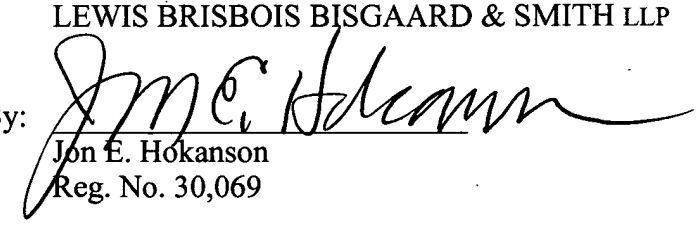
By: 

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